A MIGRATING ARMY OF SCIARID LARVAE IN THE PHILIPPINES

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On the morning of June 15, 1949 we witnessed a mass migration of fungus-gnat larvae in the rain-forest zone of Negros Island at an altitude of about 4,000 feet. Close to a temporary shelter in which we were housed, my wife noticed a strange crawling object moving over the wet, muddy soil. Closer examination at once disclosed that this was an irregular, band-like mass of small dipterous maggots such as have been noted from time to time in scattered localities in the holarctic region. Originally known as Heerwürmer in Europe and as snake-worms in the United States, these when reared, have always proved to be members of the genus *Sciara*. *Sciara* is cosmopolitan in distribution and many species are known, but it appears that only a very few ever indulge in migrational processions.

In the present instance, the mass of larvae was moving slowly in a very irregular band about a foot in length, less than an inch in width and layered to a depth of about half an inch. As has been described in some previously observed cases, the individual larvae were moving on the slimy bodies of their fellows so that progression is accomplished by the forward motion of those on the top, while those at the rear, as they are uncovered, move with a sort of superficial, belt-like, rolling motion over the cramped individuals in the lower layers. Thus, the mass moves onward, but the larvae are continually changing position with reference to one another.

It had been raining during the night and the mountain was intermittently in the clouds. The wet soil was marked with numerous foot-prints and with a shallow drainage ditch to guide water away from the shelter, there was thus little opportunity to steer a straight course and the movement was very erratic, although consistently in the general direction of the drier ground under the shelter.

In the course of a few minutes while Mrs. Brues secured some motion pictures of their movements, the swarm had advanced several feet over the irregular terrain. We collected about one-third of the marching larvae and a subsequent count of these indicates that some 900-1200 larvae were taking part in the procession. This total is surprisingly small and far less than a rough estimate made at the time the swarm was observed.

No stragglers were seen in the neighborhood of the crawling swarm in spite of the very irregular surface over which it traveled. The band of larvae was by no means of uniform breadth or thickness, swelling and contracting constantly as movement was speeded or slowed by sudden ups and downs along the path. Even at points where there were very few larvae, those coming up from behind selected without hesitation the slime trail left by those in advance.

As all individuals were fully grown and of uniform size it appears that migration was not undertaken in search of food, but to find suitable conditions for pupation and transformation. We were unable to find any fleshy fungi from which the swarm might have come. In spite of the excessive moisture in the rain forest, large fungi are comparatively scarce, although diffuse mycelial growths are plentiful on the logs, bark and smaller vegetable debris that litter the forest floor. In general the insect fauna of this area is not rich in mycetophagous forms and very few fungus-gnats were present in sweepings made in the vicinity. In common with other Mycetophilidae (in the wider sense) the species of *Sciara* are mycetophagous, developing most generally in decaying mushrooms and in vegetable material such as tubers, large seeds, etc., that are disintegrating through the action of putrefactive bacteria and fungi. Like some of their relatives, the adult midges frequently appear in incredible numbers where such food is available under the moist conditions essential to their larval development.

As would be expected the earlier observations were recorded by European entomologists. These have been referred to in several American publications. Johannsen ('09) states that the European Heerwurm is probably *Sciara thomae* L. or *S. militaris*, probably the latter.

In the United States, a number of observations have been published, dealing with Nearctic species, at least one of which has been reared by Becker ('14) and described by Johannsen ('14) as *Sciara congregata.*

The first references to migrating sciarids in our own country appears to be one by Glover in 1872. Another early record was published by Linter in his tenth report as State Entomologist of New York. Later Riley and Howard ('91) refer to two cases reported by a correspondent who observed two "snake-worms", each some fifteen inches in length and half the diameter of a man's little finger. During the following decade Webster ('94) observed two instances at Lafayette, Indiana, of swarms a foot or two in length and from one-half to two inches in diameter. At about the same time, Jones ('93) saw at Oberlin, Ohio, a "rope of maggots" five feet in length and two inches in diameter. He was unaware of their identity, but shortly afterward Williston ('93) indicated that these were undoubtedly *Sciara* larvae. Felt ('01) described several from parts of New York State, referring to several strings seen on successive days near Franklin, N. Y. These were about fifteen or twenty inches in length. He also summarized a number of previously published observations.

Following the account by Becker, mentioned above, Notman ('21) recorded an interesting case observed by him in eastern New York, applying the term "compound larvae" to the procession.

Finally, after our return to America we found in the recently published book "High Jungle" by William Beebe ('49) an account of a parade of maggots which we surmised to be a migration of *Sciara* larvae in the American tropics. This is verified by the later description of *Sciara* (*Neosciara*) *beebei* by Shaw and Shaw ('50) as the larva in question. Dr. Shaw has kindly identified the Philippine larvae as a species of *Sciara, sens lat.*

It is therefore evident that this migratory habit is more widespread than had previously been supposed.

Beebe's account is the most careful and complete description of the migrating behavior of *Sciara* which has been pub-

lished. His observations were made at his Rancho Grande laboratory in the Venezuelan Andes.

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